Australian Journal of Teacher Education

Volume 47 | Issue 7 Article 3

2022

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Recommended Citation

Russo, J., Corovic, E., Hubbard, J., Bobis, J., Downton, A., Livy, S. L., & Sullivan, P. A. (2022). Generalist Primary School Teachers' Preferences for Becoming Subject Matter Specialists. *Australian Journal of Teacher Education, 47*(7).
http://dx.doi.org/10.14221/ajte.2022v47n7.3

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Abstract: Traditionally Australian primary school teachers have been viewed as generalists responsible for instruction across all content areas. Adopting self-determination theory as a lens, the aim of the study was to explore the extent to which generalist primary school teachers are interested in becoming subject matter specialists. Questionnaire data were collected from 104 early years primary school teachers. Findings suggest that two-thirds of these generalist teachers expressed an interest in specialising in either English, mathematics, and to a far lesser extent, science, such that they would be responsible for exclusively teaching this subject. Preferences for specialisation were based on teachers' self-perceived content and pedagogical expertise and/ or their enjoyment of teaching in this content area. By contrast, the one-third of teachers who would choose to remain generalists referred to the value in a variety of teaching experiences, teaching from a whole child perspective and content integration. Implications for educational policy are discussed.

Introduction

In Australian school settings, primary school teachers and their associated classrooms have been traditionally viewed as self-contained, with the respective classroom teacher responsible for instruction across the full range of learning areas (Ardzejewska et al., 2010; Mills & Bourke, 2020). This includes discipline areas such as English, mathematics, science, the arts and humanities. Within this paradigm, primary school teachers and their classrooms have been considered as generalist teachers in terms of their subject matter knowledge (Mills & Bourke, 2020). To the extent that primary school teachers are considered to possess specialist pedagogical knowledge, they are viewed as specialists in educating young children (Thornton, 1990). More recently, however, the notion of primary school teachers becoming subject specialists has come into focus. Recent changes to the Australian Institute for Teaching and School Leadership (AITSL) teaching standards now require all pre-service primary teacher preparation programs to provide all primary graduates with a subject specialisation (AITSL, 2017), with a focus on "…prioritising science, mathematics or a language" (Teacher Education Ministerial Advisory Group (TEMAG), 2014, p. 22).

Pre-dating these policy changes, Ardzejewska et al. (2010) undertook a comprehensive study which invited participation from all primary school principals in New South Wales, and in which one-quarter of principals participated. They found that almost three-quarters of principals (73%) had used subject specialist teachers in their schools, defined as teachers employed to teach only one subject area. Over half (54%) of these principals indicated that they had employed a specialist to teach in the key learning area of science and technology, over one-third (39%) in the creative arts and over one-fifth (21%) in personal development health and physical education. By contrast, very few principals employed English specialists (5%) and no principals reported employing mathematics specialists. Indeed, more in-depth qualitative follow-up interviews with a subset of participants revealed that primary school principals viewed the teaching of mathematics and English as the "bread and butter" of primary school teachers and that the "classroom teacher should be teaching the(se) basic skills" (Ardzejewska et al., 2010, p. 209). By contrast, principals noted that variable expertise and interest amongst teachers meant that some areas of the curriculum, such as music or physical education, were most appropriately taught by a teacher with specific skills and experiences, and therefore may warrant specialisation. This finding that principals are reluctant to have teachers specialise in the core content areas of mathematics and English resonates with another more recent study involving New South Wales primary school principals, which found that "…even when schools had funds to employ an additional teacher as a 'mathematics specialist', the role of this person was to provide professional development and support for other teachers, not teaching the mathematics for them" (McMaster et al., 2018, p. 556).

Interestingly, Ardzejewska et al. (2010) also reported that principals perceived little guidance from external agencies (e.g., education departments) as to how they might incorporate specialisation into their schools. Finally, in addition to teacher knowledge and their own assumptions about what the domain of a primary school teacher should constitute, logistical issues, such as school workforce arrangements, as well as school-level priorities, determined decisions around who to employ as a specialist and in what subject matter area.

Beyond principals' views about the role of specialists, other studies have probed teachers themselves about their views of the affordances and constraints of subject specialisation (Brobst & Markworth, 2019; Gerretson et al., 2008; Liu, 2011; Markworth et al., 2016). However, less is known about whether generalist primary school teachers would be interested in specialising, and, if so, what subject specifically they would be interested in specialising in, and the reasons for this choice. In particular, although the notion that generalist primary school teachers should be teaching the core subject areas of mathematics and English seems to be well established from a principal's perspective (Ardzejewska et al., 2010; McMaster et al., 2018), whether teachers themselves concur with this conclusion warrants examination. The current study seeks to shed some light on this issue by asking generalist teachers of early years primary school students (Foundation-Year 2; 5-8 year olds) currently working in the Catholic Education systems in New South Wales and Victoria their preferences with regards to specialisation; in particular, whether they would be interested in specialising in English, mathematics or science and exclusively teaching this subject, or would rather remain in a generalist teaching role.

Defining a Subject Specialist

The notion of specialisation in a primary school setting has not been clearly and consistently defined in the literature, with the definitions to describe specialisation and their corresponding roles varying notably (Mills et al., 2020). Indeed, this confusion has filtered down into pre-service teacher attitudes to specialisation. Mills and Bourke (2020) undertook semi-structured interviews with five Australian pre-service Masters of Teaching students to glean their views about holding a specialisation as part of the recent changes to AITSL teaching standards noted earlier. They found that qualifying as a specialist was considered problematic by these pre-service teachers, as they perceived themselves to be novice teachers inappropriately positioned as expert due to their qualifications. The authors concluded that, although some teachers perceived the specialisation as being valuable, the lack of definitional clarity as to what constitutes a specialist teacher and what their role in a school should be was confusing for all stakeholders.

One potentially useful framework for defining the level of specialisation amongst primary school teachers is provided by the Office for Standards in Education, Children's Services and Skills (OFSTED) (1997) in the United Kingdom. They put forward four categories of teachers distinguished by the extent to which they are subject matter generalists or specialists:

1) The generalist teacher: "teaches most or all of the curriculum, probably specialising in age-range rather than subject";
2) The generalist/ consultant teacher: "combines a generalist role in part of the curriculum with cross-school coordination, advice and support in one or more subjects";
3) The semi-specialist teacher – "teaches his/her subject, but who also has a generalist and/or consultancy role";
4) The specialist teacher – "teaches his/her subject full-time" (OFSTED, 1997, p. 43).

In line with a recent study by Brobst and Markworth (2019), we define specialists in the current paper as "…individuals with responsibility for teaching a particular subject to two or more groups of students" (p. 370), rather than individuals whose specialisation is limited to supporting other teachers within a particular subject matter domain (e.g., peer coaching). This would correspond to category 3 (semi-specialist teacher) or category 4 (specialist teacher) using the OFSTED (1997) taxonomy. It could encompass teachers who combine specialist teaching with some generalist responsibility (e.g., a classroom teacher who is part of a three-teacher team and is responsible for teaching mathematics to all three classes of students) or who exclusively teach a particular subject (e.g., they are employed by the school as a science teacher). Moreover, in line with the current study's focus, our remaining examination of the literature will focus on research that has considered specialisation in core instructional areas, such as mathematics and English, rather than exclusively in subjects such as physical education and music.

Perceived Benefits of Specialisation

Numerous potential advantages to specialisation have been noted, including the notion that teachers: have less content to learn and cover; experience streamlined preparation and planning; can more easily seek out targeted professional learning; can more effectively collaborate; and can better meet student academic needs due to their enhanced knowledge (Brobst & Markworth, 2019; Gerretson et al. 2008; Johnson, 2013; Liu, 2011; Markworth et al., 2016). Moreover, many of these benefits are interconnected and self-reinforcing. Specifically, teachers will self-select to specialise in a particular subject matter area based on

their relative interest, enjoyment and possibly aptitude. This potentially creates a virtuous circle of enhanced competency, as teachers seek out professional learning experiences that match, and in turn enhance, their existing strengths. Teachers benefit from enhanced job satisfaction and reduced stress, whereas students benefit from improved instructional quality (Gerretson et al. 2008; Strohl et al. 2014).

Indeed, there is some evidence for the generation of such virtuous circles within the domain of mathematics instruction. Specifically, research has found links between positive disposition towards teaching mathematics and endorsement of what is viewed as good practice in primary mathematics education, such as student-centred structured inquiry approaches. For example, Wilkins (2008) in their study involving 481 in-service US elementary teachers, found that teachers with more positive attitudes towards mathematics were more likely to believe in the effectiveness of inquiry-based instruction. Similarly, Russo et al. (2020) in their study involving 98 early years Australian primary school teachers, found that teachers who valued opportunities for students to struggle productively whilst learning mathematics through work on cognitively demanding tasks were more likely to enjoy mathematics teaching.

Perceived Benefits of Generalisation

From a teacher perspective, it has been noted there are potential advantages to being a generalist teacher in terms of enhanced teacher-student relationships and classroom community, opportunities to integrate different subject matter areas, and potentially fewer disciplinary and classroom management issues (Liu, 2011); however, these potential advantages have often not borne out empirically with in-service teachers (Markworth et al., 2016; Strohl et al., 2014). In their aforementioned study involving US pre-service teacher views about working as a generalist teacher as compared to a specialist teacher, Liu (2011) noted that pre-service teachers perceive that being a generalist teacher will provide them with greater knowledge of their students and high quality teacher-student relationships vis-à-vis being a specialist teacher. Moreover, pre-service teachers speculated that consistency of one teacher under a generalist structure might also be an advantage as differing classroom rules and norms could lead to student confusion and uncertainty, whilst transitioning between classrooms might result in lost instructional time. However, comparative studies involving specialist and generalist in-service teachers have only found limited support for these concerns. For example, Markworth et al. (2016), in their mixed method study involving 34 elementary content specialists (mathematics and science) with a matched generalist-teacher comparison group, did not find notable differences in terms of teacher perceptions as to how well they knew their students. Moreover, there were also no notable differences in instructional time lost to transitions. Finally, in a separate study involving pre-service teachers, Mills and Bourke (2020) noted that one potential disadvantage of specialisation, and therefore a comparative advantage of a generalist model, is that it potentially perpetuated the belief that some so-called difficult subjects, such as science, are beyond the comprehension of ordinary generalist teachers.

There also appear to be some advantages to generalisation compared with specialisation with regards to the quality of teacher-student relationships from a student perspective, particularly for students in the early years, although whether this finding holds depends on how opportunities for specialisation are organised. Specifically, Chang et al. (2008), in their study involving 1802 US primary school students (Grades 3-5), found that for younger students (8 and 9 year olds), their perceptions of teacher trust and respect and the level of supportiveness they experienced were higher in settings comprised of generalist

teachers than in settings with specialist teachers. By contrast, there were no differences in these factors detected for older students (10 and 11 year olds) across settings. Moreover, any potential disadvantage of a more specialised structure disappeared when comparing a two-teacher model (e.g., one teacher responsible for mathematics and science; the other teacher responsible for English and The Arts) to a self-contained, generalist teacher model.

The Current Study

To summarise, both specialisation and generalisation offer distinct affordances and constraints, although empirical support for the affordances of specialisation appear more robust, at least from the perspective of teachers (Markworth et al., 2016). However, any evidence for the superiority of specialisation at the level of student learning outcomes is limited, partly due to inconsistent definitions and the wide range of specialisation models utilised by schools noted earlier (Webel et al., 2017), and partly due to an absence of such studies in the literature (Mills et al., 2020). Indeed, Mills et al. (2020) recent systematic literature review into primary disciplinary expert teachers in science and mathematics classrooms concluded that "there is insufficient evidence to know whether specialist teachers or generalist teachers with a specialisation positively impact instructional quality and student learning" (p. 1). Although clearly more research into the relationship between levels and models of specialisation and student learning outcomes is necessary, there is also a need to further our understanding of the extent to which generalist primary school teachers are interested in becoming subject matter specialists in the first instance. Such information is important because exploring alternative instructional models necessarily requires teachers who are willing to embrace new roles and responsibilities if sustained pedagogical shifts are to be successfully navigated (Gregoire, 2003; Lee & Min, 2017).

Further, on the subject of teacher specialisation, the participants and focus of discussions in the available literature typically focused on primary teaching as a whole (ages 5 to 12) or upper primary school (ages 8 to 12). There was a dearth of evidence specific to the early years (ages 5 to 8) of primary teaching and learning.

Consequently, our two research questions are:

1) What proportion of in-service generalist primary school teachers currently teaching in the early years would be interested in becoming a subject matter specialist in one of English, mathematics or science?
2) What are the reasons as to why generalist primary school teachers currently teaching in the early years would be interested in specialisation, as compared to remaining a generalist primary school teacher?

Theoretical Framework: Self-Determination Theory

One lens through which to conceptualise teacher preferences to operate as generalist primary school teachers or become subject matter specialists is self-determination theory. Self-determination theory argues that there are three fundamental psychological needs that catalyse behaviour: autonomy, competence and relatedness (Deci & Ryan, 2012). At an overarching level, autonomy refers to "the need to self-regulate one's experiences and actions" and is "associated with feeling volitional, congruent and integrated" (Ryan & Deci, 2017, p. 10). Competence refers to "our basic need to feel effectance and mastery", amplified in life contexts that are highly valued by the individual (p. 11). Finally, relatedness concerns feelings of being "socially connected" and relates to both a personal sense of belonging and

the experience of "giving or contributing to others" (p. 11). The framework of self-determination theory has been used extensively in a range of settings to better identify environmental conditions and decisions that support or inhibit a person's ability to thrive and experience psychological wellbeing (Ryan & Deci, 2017).

While autonomy, competence and relatedness are considered the pillars that underpin self-determination, it is critical to recognise a key attribute within the framework is the interconnected, reflexive relationship between the three needs. For example, feeling connected, valued and accepted are critical factors in establishing relatedness and these social conditions are necessary in fostering one's sense of autonomy and competence (Ryan & Deci, 2017). Similarly, the use of constructive feedback, an important strategy for improving competence, is most effective when strong working relationships are present (Ryan & Deci, 2017). Just as positive alignment can strengthen all three needs and lead to flourishing, conditions that are restrictive or dismissive to one or more basic need weakens the gestalt, leading to poorer outcomes (Niemiec & Ryan, 2009). Such conditions can be described as coercive, restrictive or highly pressurised.

Comprehending the interconnected nature of the three basic needs also requires an understanding of the various ways in which autonomy is described and interpreted. In self-determination theory, autonomy is considered to be closely aligned with the continuum of motivation (Ryan & Deci, 2006). The impetus for motivation can range from intrinsic, driven purely by an individual's interest, through to amotivation, which describes failure to participate at all (Roth et al., 2007). Along this continuum exists a range of factors, both positive and negative, that are linked causally to one's motivation (Niemiec & Ryan, 2009). Positive influences on motivation include factors such as participating in inclusive environments, holding shared goals, and an individual's desire to overcome challenges. Factors which have a less positive (or negative) influence include the prospect of external rewards, a fear of failure, and performance pressures (Roth et al., 2007). If one's motivation stems from a positive orientation, feelings of autonomy will ensue. In social and collaborative environments such as teaching, it is therefore important to recognise how various conditions can contribute to perceived autonomy, which will subsequently impact on satisfying the other basic needs.

It can be argued that the desire to remain a generalist primary school teacher, or instead choose to become a subject matter specialist, can be explained by a teacher's motivation to meet these three basic psychological needs. As is outlined in Figure 1 and Figure 2, the literature would suggest that both roles have at least distinct potential comparative advantages over the other in meeting the needs for autonomy, competence and relatedness. A given teacher's preference, therefore, may relate to how much they value, or are able to leverage, these distinct advantages. For example, a teacher who values spontaneity and serendipitously connecting different subject matters areas may find their need for autonomy is better met by remaining a generalist teacher; whereas a teacher who is particularly passionate about sharing their love of literature with their students might find a stronger sense of integrated regulation, and therefore autonomy, in becoming an English specialist. Similarly, a teacher who orientates themselves within their classroom community of students as their primary way of relating to others in a school context is likely to have their need for relatedness better met by remaining a generalist teacher. By contrast, a teacher who first and foremost pursues close and meaningful relationships with like-minded colleagues in the school environment to meet their need for relatedness may be interested in becoming a subject matter specialist, taking advantage of the increased opportunities for collaboration with other teachers. According to self-determination theory, whatever their specific preferences, if the decisions teachers make about remaining a generalist or becoming a subject matter specialist are driven by positively orientated motivations, it can be inferred

that the three basic needs of autonomy, competence and relatedness are more likely to be satisfied. Alternatively, if a teacher is required to make the choice based upon negative external pressure, such as performance outcomes, it is likely they will experience conditions in which these basic needs are not fulfilled.

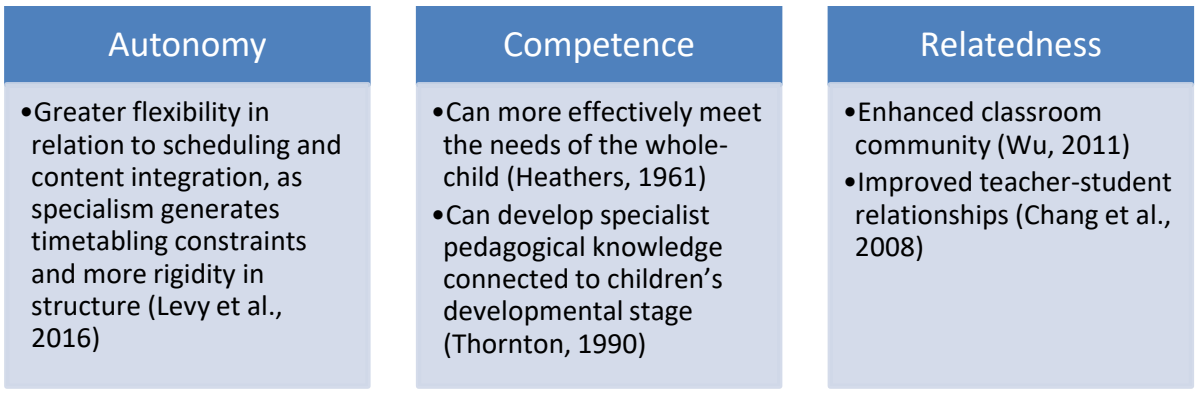

Figure 1: Advantages of remaining a generalist teacher in terms of meeting the three basic psychological needs of autonomy, competence and relatedness

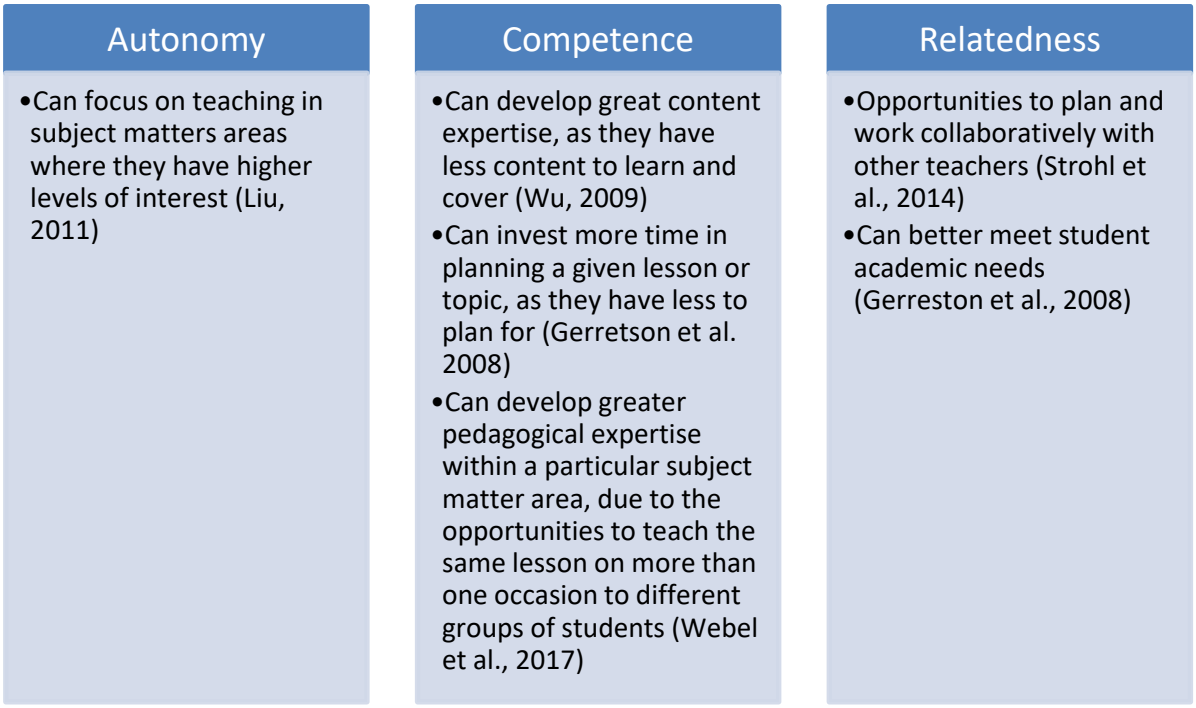

Figure 2. Advantages of becoming a specialist teacher in terms of meeting the three basic psychological needs of autonomy, competence and relatedness

Method

Participants

Participants comprised 104 Early Years Primary Teachers (Foundation to Year 2), currently employed as generalist teachers in Catholic primary schools in Victoria and New South Wales, Australia. Most participants were female (n = 100; 96%).

Procedure

Participants were attending a mathematics professional learning day as part of their participation in a broader mathematics professional learning initiative focussed on teaching mathematics through sequences of challenging problem-solving tasks. Participation in the professional learning was structured such that all generalist teachers from the early years area (Foundation-Year 2) in each school whose principal had chosen to participate in the program were expected to both attend the professional learning day and complete a questionnaire. Consequently, although the sample drawn is by no means random, we have no reason to expect that the preferences disclosed by these teachers would differ from other early years primary school teachers in Australia.

Two of the items on the questionnaire were analysed for the current study. Item 1 asked participants whether they would be interested in specialising in one subject matter area (English, mathematics or science), or would rather remain as generalist teachers. Item 2 asked participants a follow-up open-ended question, inviting them to explain the reasons for this preference. The exact items are included below:

1. If you had an opportunity to become a specialist primary school teacher in one of these subjects (i.e., only teach this subject), which would you choose?
    a. English (including reading, writing, spelling, grammar)
    b. Mathematics
    c. Science
    d. None of these. I would remain a generalist
2. Please explain why you would choose this particular subject to specialise in, or why you would instead choose to remain a generalist teacher.

Analysis

Quantitative analysis of the relationship between teacher characteristics (teaching experience and year level taught) and preferences for specialisation was analysed using IBM SPSS Statistics, Version 25. Qualitative analysis was undertaken using inductive thematic analysis (Braun & Clarke, 2006). Specifically, all open-ended teacher responses under each of the three preference options (generalist, English specialist and mathematics specialist) were read and re-read until patterns in the data emerged that could be distilled into themes. Themes were developed such that they provided both a rich description of the data, whilst being sufficiently parsimonious to enable aggregation, thus facilitating comparison across the three preference options. Each teacher response was allocated to a single theme, with the exception of the themes “competence/ expertise in content/ pedagogy” and “interested in/ passionate about content/ pedagogy”, which frequently overlapped (see Figure 3 and Figure 4). Quotations from teacher participants were included throughout to help illustrate and unpack particular themes.

Results

As can be seen from Table 1, two-thirds of participating teachers (67%) expressed an interest in specialisation. Teachers who were interested in specialising were approximately equally likely to nominate English (33% of participants) or mathematics (31% of participants). Only four teachers (4%) expressed an interest in specialising in science. These four teachers provided a variety of reasons for this preference, including: that science is an

important and dynamic field of study; that it connects to the real world and provides opportunities for hands-on, inquiry-based learning; that it is enjoyable to teach and learn because it is about theory testing and discovery; and because of having specific science content expertise. This small group of participants who indicated a preference to be science specialists will be excluded from subsequent analysis.

Response	N (%)
Not interested in specialisation (i.e., wants to remain a generalist)	34 (32.7%)
Interested in specialisation	70 (67.3%)
English	34 (32.7%)
Mathematics	32 (30.8%)
Science	4 (3.8%)

Table 1: Generalist early years primary teachers' interest in becoming specialists by subject matter

There was no indication that the level of teaching experience notably influences interest in specialisation in general, or interest in specialising in one subject area in particular (see Table 2), which was confirmed by a one way analysis of variance, $F(2,97) = 0.425$, $p > .05$.

Response	N	Mean (SD) Time Spent Teaching	Median Time Spent Teaching
Not interested in specialisation (i.e., wants to remain a generalist)	34	11.6 (11.4)	6
Interested in specialisation	70	11.6 (9.6)	7
English	34	13.1 (10.6)	9
Mathematics	32	10.9 (8.6)	7

Table 2: Interest in specialisation by number of years of teaching experience

Moreover, participants who taught students in their first year of school (Foundation) were no more or less likely to have an interest in specialisation than teachers who only taught Year 1 and/ or Year 2 students. Although the data presented in Table 3 suggests a slight proclivity for Foundation teachers to be more likely to want to specialise, a chi-squared test of independence revealed that this difference was not statistically significant [χ^2 (1, N = 104) = 0.571, $p > .05$].

Response	Foundation (n=39)	Year 1 and/ or Year 2 students (n=65)	Total
Not interested in specialisation (i.e., wants to remain a generalist)	11 (28.2%)	23 (35.4%)	34 (32.7%)
Interested in specialisation	28 (71.8%)	42 (64.6%)	70 (67.3%)
English	15 (38.5%)	19 (29.2%)	34 (32.7%)
Mathematics	11 (28.2%)	21 (32.3%)	32 (30.8%)

Table 3: Interest in specialisation by year level taught

Thematic Analysis: Explanation for Preferences

Preference to Remain a Generalist Teacher

When asked whether they would rather become a specialist teacher in one of English, mathematics or science, or remain a generalist primary school teacher, approximately one-

third of teacher participants (n = 34; 32%) indicated they would choose to remain a generalist teacher. Three notable themes emerged that explained this preference:

- Greater variety in teaching experiences, including self-development opportunities as an educator (n = 21);
- Opportunities to teach from a whole child perspective, including building relationships (n = 6);
- Opportunities to integrate learning experiences across curricula areas (n = 7).

Most teachers in this category (n = 21) indicated that they would choose to remain a generalist teacher because this role offered *greater variety in teaching experiences*. At times, those participants who elaborated on their desire for variety indicated that the generalist teacher role was more stimulating than being a specialist teacher.

> *I feel I enjoy being a generalist teacher as I can cover a range of subjects and topics and not just the same repetitive topics each year. I like the mix and changing/learning from my teaching practices each year. (Teacher Number 83 [TN83])*

However, often it was the variety of self-development opportunities afforded to a generalist teacher that was viewed as particularly appealing:

> *I would like to remain a generalist teacher as it would give me the opportunity to grow in all areas of my teaching. (TN46)*
>
> *I really enjoy learning about effective teaching of each of these areas and best ways to accommodate all students. (TN13)*

Related to this, some teachers (n = 6) expressed their desire to remain in a generalist teacher role as stemming from the importance of teaching from a *whole child perspective*. This included opportunities to better understand an individual student's learning.

> *In the position that I am in at the moment [a generalist teacher], I believe that I would need to understand the importance of it all coinciding with one another for the students' learning. (TN18)*

It also incorporated the importance of developing the teacher-student relationship, which was supported by being in a classroom teacher role:

> *I like teaching all subjects to my class. I love the relationship you build with your class throughout the year. By the end of year you know them inside and out. (TN14)*

Finally, several teachers (n = 7) suggested that the reason that they valued being a generalist primary school teacher was the opportunity to integrate learning across different content areas. Rather than being driven by teacher preferences for their own experience, this perspective at times reflected the nature of learning from a student perspective:

> *I would remain a generalist teacher to give my team and myself as many opportunities to incorporate our learning into different subject areas so students would be able to get more experience in seeing how all of their learning is interconnected. (TN42)*
>
> *Because students need a balance and Literacy and Numeracy can be interwoven (eg the Etymology of mathematical words). (TN74)*

For other teachers, being a generalist teacher was viewed as both a satisfying way of teaching, due to meeting their own appetite for variety, as well as being an effective way of supporting student learning, because it emphasised connections between different content areas:

> *I would choose to remain a general teacher as I would love to be able to continue to combine all of these learning areas as I see them quite interconnected and not sitting as a subject alone. It is important to break up each of the above and teach within but then I believe it important to do open*

ended tasks that students are interested in that combine all of the above subjects in a real world way. (TN36)
I feel as though all of these subjects are important and they are all connected with one another. I enjoy teaching each of these subjects a lot and I feel as though students participate in each of these subjects really well. (TN102)

Preference to Become an English Specialist Teacher

Similarly, one-third of teachers (n = 34; 33%) responded that, if given a choice, they would choose to become an English specialist teacher, rather than continue as a generalist teacher. Analysis of the open-ended item inviting teachers to elaborate on this choice revealed two clear themes. Almost all teachers (n = 32) indicated that they were particularly interested in English as a content area, and/ or had specific pedagogical competence and expertise that related to this subject matter area.[1] Figure 3 captures the fact that several teacher responses made reference to both their interest in the content and their self-perceived competency.

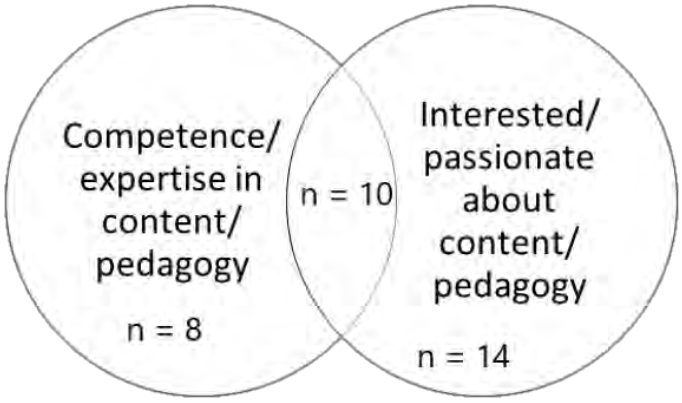

Figure 3: Participant reasons for wishing to specialise in English

As is clear from Figure 3, most teachers (n = 24) in this category indicated that they were interested in, and even passionate about, literature and the English language in general or teaching literacy in particular. For some teachers, becoming a specialist was driven by their personal passion for English as a content area:

I am passionate about literacy and I love reading and writing. (TN47)
I love English, words and stories. (TN56)

For other teachers, it was the act of teaching students to learn to read and write that they were most passionate about, either because they felt that learning such skills was satisfyingly tangible or particularly relevant and important to students' lives:

Teaching students Literacy skills is one of my passions. I love watching students grow in their knowledge as well as their skills from the beginning of the year to the end of the year. It is very satisfying to see their growth when you remember where they started. I think you can see more growth in Literacy than perhaps in other KLA's. (TN80)

[1] Of the remaining two teachers who expressed an interest in English specialisation, one emphasised a desire for further professional development in this learning area, whilst the other indicated that English was the most important subject to teach, without connecting this importance to their competence or enjoyment.

> *I have always enjoyed literacy and I like that there are so many levels to it. Teaching children to do the fundamentals of reading and writing is a skill they will always need in an ever-changing world. (TN61)*

A personal love of literacy and a love of teaching literacy were also often merged, with such individuals emphasising both their passion for the English language, and their passion for instilling in their students a similar appreciation:

> *I love reading and writing and have a passion for embedding a love for literature in students. I love how engaging a good text can be for students, and the heights they can reach in their writing. (TN77)*
>
> *Literacy is my passion. It is used in all aspects of life. It is a life skill needed from the simplest tasks such as writing a shopping list or reading a picture book to your child, to writing in depth essays or completing formal work. I am very passionate about children's literature and love to share my passion and enthusiasm about this with my students, hoping to instil a similar love for books. (TN1)*

Figure 3 indicates that around half of the teachers (n = 18) in this category suggested a preference for becoming an English specialist teacher due to them feeling particularly competent in this learning area. Sometimes this competency was also linked to having specific professional learning and expertise:

> *I have taught reading and writing in the early years for five years and always get great results at the end of year. My pupils often come in unable to hold a pencil and at the end of the year can write sentences. I have also taught in London and embedded the RWI phonic programme into my current school in Australia. (TN79)*
>
> *I have had Reading Recovery training in the past and have seen the benefits of my training used back in the classroom. I think specialisation in specific areas of English and maths would benefit students - as some [teachers] are more skilled in areas, with more training. (TN48)*

Finally, several teachers had responses coded to both these themes (n = 10), often capturing converging feelings of competency and a passion for the subject matter content:

> *At this point in my career I believe I've had more professional learning and experiences in Literacy. I believe that's why I have more of a passion in this subject. (TN65)*
>
> *I am passionate about Reading and am already trained as an R3 teacher [Evidence-based early literacy intervention]. (TN76)*

Occasionally this view of English as a subject matter area was juxtaposed against a lack of competency or interest in other areas, such as mathematics.

> *I have a love of Literacy and always have. I always find it easier to attain information surrounding English. If I'm honest I have a fear of mathematics and always have. (TN2)*
>
> *English is the area I am strong in. I do not find maths or science interesting. (TN25)*

Preference to Become a Mathematics Specialist Teacher

Again, approximately one-third of teachers (n = 32; 31%) indicated that, confronted with the opportunity, their preference would be to become a specialist teacher of mathematics, rather than remain in their generalist teacher role. In a similar manner to the would-be English specialists, analysis of the follow-up open-ended item revealed that, for

most of these individuals, an interest in mathematics teaching and/ or possessing pedagogical competence in mathematics were the main motivating factors for wanting to specialise as mathematics teachers (n = 26). However, as is apparent in Figure 4, relative to motives for specialising in English, there was more emphasis on preferences being driven by an enjoyment of mathematics teaching, as compared to self-perceived competence. The only other notable theme to emerge was a small number of teachers (n = 5) who indicated that they would like to pursue specialisation in mathematics because they valued it as a professional development opportunity.[2]

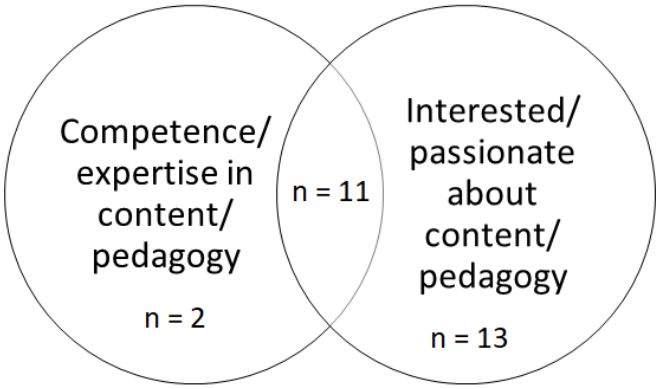

Figure 4: Participant reasons for wishing to specialise in mathematics

Most teachers (n = 24) who would prefer to become a mathematics specialist indicated that they enjoyed teaching, and at times learning, about mathematics. Again, in contrast to the would-be English specialists, there were no teachers who indicated that their desire to specialise was driven by a love of mathematics as a content area devoid from the experience of teaching it. On the contrary, all teachers who mentioned that they were drawn to mathematics as a content area also explicitly noted that they enjoyed it as a subject to teach:

> *I enjoy challenging and exploring the different topics with the children, and seeing how they analyse and express how they have solved a problem. (TN27)*
> *I enjoy using and teaching maths. I have an excitement when teaching maths and when students enjoy learning it. (TN28)*

One teacher even noted that they enjoyed teaching mathematics more than literacy, despite being comparatively more competent in literacy, in part driven by the desire to create for their students a more positive experience of mathematics than they themselves experienced:

> *I feel I am really strong in teacher literacy, it has always been a strength of mine even when I was a student in school. Numeracy has always been harder for me and something I need to work at. Numeracy however is my favourite subject to teach. I think because I found it so challenging I really enjoy changing the way I teach for my students to make numeracy more engaging and allow students to have more lightbulb moments. (TN67)*

Several teachers indicated that their enjoyment of teaching mathematics arose from their interest in generating hands-on learning experiences, fostering interactivity and/ or in making connections between mathematics taught in school, and how one might use mathematics to

[2] The remaining teacher who indicated a desire to specialise in mathematics did not provide a reason for their preference.

navigate the world around them. Collectively, these teachers appeared to value opportunities to bring mathematics learning to life for their students:

> *I enjoy providing a range of hands on learning experiences to engage a range of learners (abilities, interests, skills). I enjoy how interactive learning can be by exploring mathematical concepts. (TN96)*
>
> *I try to show the students the connections between their classroom learning of maths and how they will and do use it daily. (TN28)*

Although a number of teachers also highlighted their relative competency as a teacher of mathematics as a further reason why they would be interested in specialising (n = 13), this was usually mentioned alongside their interest in, and passion for, teaching mathematics.

> *I have always enjoyed mathematics myself growing up and it was the subject I tended to connect with the most and could understand quite quickly. For that I really enjoy teaching it and watching students develop and grow their skills. I would love to build my knowledge and specialise in mathematics as there is so many ways it can be taught and (be) engaging for the students. (TN97)*
>
> *I love mathematics, it's logical to me - students rise up to problem-solving. It can be creative and very open to catering to students. It's very hard having so many hats as a generalist primary school teacher. (TN95)*

Interestingly, this last quote was also the only reference across the entire questionnaire by a teacher who indicated a desire to specialise due to the difficulties being a "Jack of all trades" as a generalist primary teacher.

Finally, a small number (n= 5) of teachers noted that they would embrace the opportunity to specialise in mathematics because it was an opportunity to expand their professional knowledge as a teacher:

> *I really enjoy learning new and different strategies for students with high needs. I appreciate being able to cater to their needs and help all students access the learning in the own way. (TN50)*
>
> *I am currently training to become an Extending Mathematical Understanding (EMU) teacher. So far I have found it very resourceful and informing. It is so important for teachers to understand the importance of mathematics and how vulnerable a child can be. We are then able to plan more personalised lessons to support them. (TN69)*

Again, for one teacher, seeking out such professional development experiences and becoming a mathematics specialist was motivated in part by the desire to provide their students with a more positive experience of mathematics than they themselves had experienced at school:

> *As a student I strongly disliked maths and had what I would describe as "maths anxiety". I believe it is because much of what I was taught as a student was rote based, and the pressure to remember systems made me feel overwhelmed. As I have grown older and understood the fluidity of maths I now understand that it is strategy based and that is the way I learn best. My mathematics subjects at university were the ones that I did best in, and the ones I enjoyed the most. I hope that I can encourage my students to trust their own strategic thinking and create a love for mathematics. I also know that I have so much to learn in this area and would enjoy doing further study in the area of mathematics. (TN32)*

Discussion and Conclusions

In considering our first research question, approximately two-thirds (67%) of generalist early years primary school teacher participants expressed an interest in becoming subject matter specialists, defined in our study as "individuals with responsibility for teaching a particular subject to two or more groups of students" within the domains of English, mathematics or science (Brobst & Markworth, 2019,p. 370). We were surprised by this finding. Our assumption prior to collecting this data was that most participants would rather remain as generalist teachers, concurring with principals from the Ardzejewska et al. (2010) study that mathematics and English are effectively the "bread and butter" of primary school teachers and that all classroom teachers "should be teaching the(se) basic skills" (p. 209). One potential explanation for this disconnect is that views of principals do not reflect the preferences of practicing teachers. Another potential explanation is that expectations of primary school teaching have changed materially over the decade or more since the Ardzejewska et al. (2010) study, and the requisite level of pedagogical content knowledge required to teach a given subject has increased. Indeed, the recent push in Australia to qualify generalist teachers with greater subject matter expertise through acquiring a specialisation provides at least indirect evidence that such a shift has occurred (Mills & Bourke, 2020). Finally, it should be acknowledged that there might be something idiosyncratic about our sample of participants (e.g., teaching within the early years, Catholic system) that makes them more likely to value specialisation compared with primary school teachers more generally. However, we have little reason to suspect such differences exist based on the research literature. For example, the Catholic and government labour markets are similar, with pay and conditions being almost identical in Australia (Webster et al., 2006), whilst research suggests that the decision to teach in one setting over another is more circumstantial than reflective of an a priori commitment (Scheopner, 2010). Although future research would need to establish whether non-committal preferences expressed in a questionnaire would translate to changes in behaviour, the current findings provide at least preliminary support for the notion that attitudes of currently generalist teachers should generally not be considered an obstacle to primary school's experimenting with greater subject specialisation in core instructional areas.

Another interesting observation relevant to our first research question was that generalist early years primary school teachers were approximately as likely to nominate an interest in becoming a subject matter specialist in mathematics (31%) as English (33%). Again, this was perhaps surprising given previous research. In particular, Wilkins (2009) found that US elementary teachers who taught students in their first three years of school were most likely to nominate reading and language arts as their favourite subjects to teach, with mathematics a comparatively distant fourth favourite. Although it is possible that our questionnaire being administered prior to mathematics professional learning had an influence on these responses (e.g., by 'priming' teachers to value mathematics more than they otherwise would), it is important to keep in mind that the commitment to attend the professional learning was at the school level, rather than at the level of the individual teacher. Consequently, we have no reason to believe that teachers who disproportionately value teaching mathematics relative to their colleagues were more likely to attend the professional learning, which would have otherwise confounded the representativeness of our questionnaire results.

Given a substantive interpretation of our results seems warranted, we might speculate that the Australian teachers' approach to mathematics instruction differed on average from the US teachers in the Wilkins (2009) study. For example, it might be that teachers in our study were more likely to adopt student-centred structured inquiry approaches, thereby

elevating their preference to be mathematics specialists, given we know that such pedagogies are associated with teacher enjoyment of teaching mathematics (Russo et al., 2020). Alternatively, it may be that the fact that the Wilkins study was asking about one's favourite subjects to teach, rather than about specialisation per se, meant that teachers considered factors beyond their own enjoyment when deciding on specialisation, such as their perceptions of their own pedagogical content knowledge relative to other teachers, or the relative demand for subject matter specialists in this area. This last point may at least partially explain why so few teachers expressed a preference to be a subject matter specialist in science (4%), given it may not be viewed as a core instructional focus in the early years of primary school in the same manner as English or mathematics for which minimum instruction time is often specified (e.g., 100 minutes of daily literacy instruction and 60 minutes of daily numeracy instruction; Catholic Education Diocese of Parramatta, 2021).

This leads us into our second research question around the reasons generalist early years primary teachers provided for their preference to specialise, or instead remain a generalist teacher. Considering first the preference to remain a generalist. Two of the three themes discussed both resonated with perceived benefits noted in the literature (e.g., Liu, 2011) and can be mapped onto self-determination theory, specifically: opportunities to integrate learning experiences across curricula areas (autonomy); and the focus on teaching from a whole child perspective (competence) and on building close personal relationships with students (relatedness). However, by far the most significant theme to emerge from the data analysis was that being a generalist teacher provided greater variety in teaching experiences, including self-development opportunities as an educator. This theme was not prevalent in the existing literature, which is perhaps because it is the only theme which largely concerns the teacher and their own needs, whereas much of the research into specialisation has implicitly (e.g., Markworth et al., 2016), or explicitly (e.g., Chang et al., 2008) focussed on the impact of specialisation on meeting the needs of students. However, it is not difficult to incorporate the theme of a desire for subject matter variety into our self-determination theory framework. Specifically, valuing variety appears to be the generalist teacher equivalent of the suggested enhanced autonomy that arises when a teacher can specialise and focus on a subject matter area in which they have a high level of interest.

With regards to the reasons teachers provided for wishing to specialise in English or mathematics, the first point to note is that most teachers indicated this preference was based on their perceived expertise in this subject matter domain and/ or their enjoyment of teaching this content area, which can be mapped onto the self-determination theory needs of competence and autonomy respectively. This resonates with what we know are the perceived advantages of becoming a specialist in a subject matter domain from the literature (Gerretson et al., 2008; Lieu, 2011; Webel et al., 2017). Perhaps one difference in our study was that these benefits were not contrasted with the challenges associated with being a generalist teacher by participants in their responses, with only one participant lamenting the difficulties of covering all content areas in their current role. Moreover, the desire to build stronger collegial relationships through specialisation (Strohl et al., 2014), which was argued to support the self-determination theory need for relatedness, was also not mentioned by study participants.

Although the explanations provided for becoming a mathematics or English specialist overlapped considerably, three differences stood out. First, competency as a mathematics teacher was generally not mentioned independent of a passion and interest in teaching mathematics, whereas it was for some teachers interested in specialising in English. Second, there were no teachers who indicated that their desire to specialise in mathematics was driven by an interest in the content area disconnected from their experience teaching mathematics, whereas this was the case for some would-be English specialists. Third, several teachers

interested in specialising in mathematics indicated that they were interested in doing so to further their professional knowledge in this area, which was less the case for their English-teaching counterparts. Taken together, a noteworthy finding in this study is that teachers who indicate a preference to specialise in mathematics are often motivated by their sense of relatedness and desire to help students improve, whereas for English specialists their motivations tended to be more orientated towards their own subject matter interest. The identification of these differences reiterates the complex and various causations that motivate teachers to seek conditions that satisfy their need for autonomy, competence and relatedness in school-based environments.

Better understanding the different motivations as to why teachers would preference specialising provides greater insights for professional development and specialist teacher recruitment. For example, the justification provided by respondents in this study regarding their preference to become a mathematics specialist challenges the perception that mathematics requires a level of knowledge that makes it more difficult to teach (Mills & Burke, 2020). The emphasis on relatedness and a desire to help students improve their mathematics, rather than a personal preference for the content itself, resonates with more contemporary approaches to instruction centred on inclusive learning environments with shared goals (Roth et al., 2007). As more value is being placed on improving competence through constructive feedback cycles established through strong working relations (Niemiec & Ryan, 2009), it makes sense to consider candidates for specialist teaching positions more broadly than content preference or expertise alone.

Several limitations to our study should be noted. First, as previously discussed, the study probed teacher preferences in the abstract, without any explicit attempt to connect these preferences to concrete actions. Second, as also noted previously, the study focussed on early years primary school teachers within the Catholic education system in New South Wales and Victoria in the context of a mathematics professional learning program. Consequently, we cannot generalise our findings to all primary school teachers in all education systems in all Australian states. Indeed, we would suggest that a similar study be undertaken with a larger, more representative sample of Australian primary school teachers to gauge how robust our findings are across contexts.

This study provided an opportunity to investigate what proportion of in-service generalist teachers would be interested in becoming a subject specialist teacher and the underlying reasons that motivate teachers to make such decisions. Our findings suggest that contrary to reports in the literature, a substantial percentage of generalist teachers expressed an interest in specialising in the subject specific domains of English and mathematics. A point of interest is that many of the motivations justifying the pursuit of a specialised role are founded within student centred instructional practices, rather than simply preferencing personal expertise in a content area. An important implication is that teachers would generally be supportive of primary schools and school systems at least experimenting with greater specialisation in core instructional areas than is currently the case.

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Acknowledgments

The authors are engaged in a project funded by the Australian Research Council, Catholic Education Diocese of Parramatta and Melbourne Archdiocese Catholic Schools (LP 180100611). The views expressed are opinions of the authors who take full responsibility for the ethical conduct of the research and preparation of the article.